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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,172	10/01/2003	Lloyd G. Burrell	FIS920030073US1 (16406)	6804
23389	7590	03/02/2005	EXAMINER	
SCULLY SCOTT MURPHY & PRESSER, PC 400 GARDEN CITY PLAZA SUITE 300 GARDEN CITY, NY 11530			CHAMBLISS, ALONZO	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 03/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/676,172

Applicant(s)

BURRELL ET AL.

Examiner

Alonzo Chambliss

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 13-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 1-12 in the reply filed on 12/13/04 is acknowledged.
2. Claims 13-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected device claims, there being no allowable generic or linking claim.

Drawings

3. The drawings filed on 10/1/03 have been approved by the examiner.

Specification

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The following title is suggested: " METHOD OF FABRICATING A WIRE BOND PAD WITH Ni/Au METALLIZATION ".

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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6. Claims 1-6, 8, 11, and 12 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Greer (US 6,451,681).

With respect to Claims 1, 4, and 6, Greer teaches providing a structure 100 having at least one wire bond pad 504, 506 (i.e. made of Al alloy) in contact with a metal line 120 (i.e. made of Cu) of an interconnect structure 100, wherein at least one wire bond pad 504, 506 having an exposed surface portion. A metallic cap 600 is on at least the exposed upper surface portion of the wire bond pad 504, 506, wherein metallic cap 600 is resistant to alkaline attack. A Ni/Au metallization 314 is formed on the metallic cap 600 (see col. 1 lines 5-39, col. 4 lines 14-67, col. 5 lines 20-67, and col. 6 lines 1-51; Figs. 1-6).

With respect to Claim 2, Greer teaches wherein the metallic cap is formed on the exposed surface portion of the wire bond pad through an opening formed in an overlaying passivation stack 500, 502 (see col. 5 lines 43-59).

With respect to Claim 3, Greer teaches wherein the metallic cap 600 is formed atop an entire surface of a metal layer and then the metallic cap and metal layer are selectively etched to form the metallic cap on at least the exposed upper surface portion of the wire bond pad (see col. 6 lines 15-42).

With respect to Claim 5, Greer teaches wherein the structure further includes a barrier 122 and a lower passivation layer 118 (i.e. ILD interlayer dielectric) formed atop the interconnect structure (see col. 3 lines 12-36).

With respect to Claim 8, Greer teaches wherein the metallic cap comprises TiN/Ti (see col. 4 lines 50-55).

With respect to Claim 11, Greer teaches wherein a barrier layer 122 is between at least the metal bond pad and the metal line (see Figs. 1-6).

With respect to Claim 12, Greer teaches wherein the metal bond pad and the metal line are in contact through via opening formed in a lower passivation layer that is located on the interconnect structure (see Figs. 1-6).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greer (US 6,451,681) as applied to claims 1 and 8 above, and further in view of Yen (US 4,696,098) and De Pauw et al. (US 6,548,327).

With respect to Claims 7 and 9, Greer discloses wherein the Ni/Au pad metallization is formed by electroless deposition of Ni and Au. Greer discloses a metallic cap made of TiN/Ti. Greer fails to explicitly disclose a metallic cap made of TiN/Al. However, it is well known in the semiconductor industry to substitute Ti (titanium) for Al (aluminum) as evident by Yen (see col. 3 lines 39-45). Greer fails to disclose an immersion deposition of Au and an Al layer of the metallic cap that is cleaned/pretreated prior to forming the Ni/Au metallization. However, DePauw discloses immersion deposition of Au and an Al layer that is cleaned/pretreated prior to forming the Ni/Au metallization (see col. 4 lines 39-58). Thus, Greer and DePauw have substantially the same environment of Ni/Au layer bonded to an Al layer. Therefore, one skilled in the art at the time of the invention would readily recognize incorporating a cleaning of an Al layer and immersion deposition with the process of Greer, since the cleaning and immersion process would improve the adhesion between the Al layer and the Ni/Au layer as taught by DePauw.

9. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Greer (US 6,451,681) and De Pauw et al. (US 6,548,327) as applied to claims 1 and 8 above, and further in view of Dobson et al. (US 6,174,823).

With respect to Claim 10, Greer and De Pauw both fail to disclose wherein the Ti layer of the metallic cap is activated prior to forming the Ni/Au metallization. However, Dobson discloses activating a Ti layer prior to depositing another metal layer to the surface of the TiN/Ti layer (see col. 2 lines 53-57, col. 8 lines 54-57, and col. 9 lines 5-14). Thus, Greer-DePauw and Dobson have substantially the same environment of a

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barrier layer made of TiN/Ti. Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate activating the Ti layer prior to forming the Ni/Au metallization of Greer-DePauw, since the activating would improve the bond between the barrier layer and the Ni/Au while creating a strong barrier layer as taught by Dobson.

The prior art made of record and not relied upon is cited primarily to show the process of the instant invention.

Conclusion

10. Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (571) 272-1927.

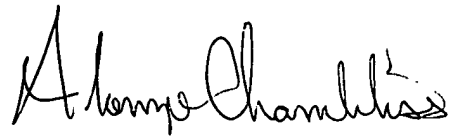
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system Status information for published applications may be obtained from either Private PMR or Public PMR. Status information for unpublished applications is available through Private PMR only. For more information about the PMR system see <http://pair-dkect.uspto.gov>. Should you have questions on access to the Private PMR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or EBC_Support@uspto.gov.

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AC/February 28, 2005

A handwritten signature in black ink, appearing to read "Alonzo Chambliss". The signature is fluid and cursive, with the first name "Alonzo" and last name "Chambliss" clearly distinguishable.

Alonzo Chambliss
Primary Patent Examiner
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